AP Physics 1 Unit Plan Spring 2020

Unit 1: Forces

AP Standards to be covered:

**1.C.1.1:** The student is able to design an experiment for collecting data to determine the relationship between the net force exerted on an object, its inertial mass, and its acceleration. **[SP 4.2]**

**1.C.3.1:** The student is able to design a plan for collecting data to measure the gravitational mass and to measure inertial mass, and to distinguish between the two experiments. **[SP 4.2]**

**2.B.1.1:** The student is able to apply to calculate the gravitational force on an object with mass m in a gravitational field of strength g in the context of the effects of a net force on objects and systems. **[SP 2.2, 7.2]**

**3.A.2.1:** The student is able to represent forces in diagrams or mathematically using appropriately labeled vectors with magnitude, direction, and units during the analysis of a situation. **[SP 1.1]**

**3.A.3.1:** The student is able to analyze a scenario and make claims (develop arguments, justify assertions) about the forces exerted on anobject by other objects for different types of forces or components of forces. **[SP 6.4, 7.2]**

**3.A.3.2:** The student is able to challenge a claim that an object can exert a force on itself. **[SP 6.1]**

**3.A.3.3:**  The student is able to describe a force as an interaction between two objects and identify both objects for any force. **[SP 1.4]**

**3.A.4.1:** The student is able to construct explanations of physical situations involving the interaction of bodies using Newton’s third law and the representation of action-reaction pairs of forces. **[SP 1.4, 6.2]**

**3.A.4.2:** The student is able to use Newton’s third law to make claims and predictions about the action-reaction pairs of forces when two objects interact. **[SP 6.4, 7.2]**

**3.A.4.3:** The student is able to analyze situations involving interactions among several objects by using free-body diagrams that include the application of Newton’s third law to identify forces. **[SP 1.4]**

**3.B.1.1:** The student is able to predict the motion of an object subject to forces exerted by several objects using an application of Newton’s second law in a variety of physical situations with acceleration in one dimension. **[SP 6.4, 7.2]**

**3.B.1.2:** The student is able to design a plan to collect and analyze data for motion (static, constant, or accelerating) from force measurements and carry out an analysis to determine the relationship between the net force and the vector sum of the individual forces. **[SP 4.2, 5.1]**

**3.B.1.3:** The student is able to reexpress a free-body diagram representation into a mathematical representation and solve the mathematical representation for the acceleration of the object. **[SP 1.5, 2.2]**

**3.B.2.1:** The student is able to create and use free-body diagrams to analyze physical situations to solve problems with motion qualitatively and quantitatively. **[SP 1.1, 1.4, 2.2]**

**3.C.4.1:** The student is able to make claims about various contact forces between objects based on the microscopic cause of those forces. **[SP 6.1]**

**3.C.4.2:** The student is able to explain contact forces (tension, friction, normal, buoyant, spring) as arising from interatomic electric forces and that they therefore have certain directions. **[SP 6.2]**

Topics to be covered:

Newton’s Laws

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| Day | Date | EQ | Agenda | Std’s |
| 1 | MON  1/13 | How do force, mass, and acceleration relate to one another? | * Unit 1 Quiz Analysis * Notes: Force types & FBD * (<http://youtu.be/Rgb8ZNIo4Xo>) | **1.C.1.1, 1.C.3.1, 2.B.1.1., 3.B.1.1, 3.B.1.2** |
| 2 | TUE  1/14 | How do force, mass, and acceleration relate to one another? | * Notes-Newtons’ 1st and 3rd law * Forces W/S * HWk: Read PhysicsClassroom about Newton’s laws (<http://www.physicsclassroom.com/Physics-Tutorial/Newton-s-Laws>) | **1.C.1.1, 1.C.3.1, 2.B.1.1., 3.B.1.1, 3.B.1.2** |
| 3 | WED  1/15 | How do force, mass, and acceleration relate to one another? | * Force TIPERS * Review for Test | **1.C.1.1, 1.C.3.1, 2.B.1.1., 3.B.1.1, 3.B.1.2** |
| 4 | THU  1/16 | Why are Free Body Diagrams and Summation Equations important? | * Unit 1 Test: Linear Motion and Balanced Forces * HW: read 2.7 From text (mastering physics) | **2.B.1.1, 3.A.2.1, 3.A.3.3, 3.B.1.1, 3.B.1.2, 3.B.1.3, 3.B.2.1** |
| 5 | FRI  1/17 | How does being on an incline affect an object’s motion? | * FRQ Mechanics * PhET Force basics * HW: Constant and Accel Motion (mastering physics) | **2.B.1.1, 3.A.2.1, 3.A.3.1, 3.A.3.3, 3.B.1.1, 3.B.1.2, 3.B.1.3, 3.B.2.1, 3.C.4.1, 3.C.4.2** |